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New report of decapod macrurans from the Eocene of Catalonia and Aragón (Spain)

Abstract - The recent discovery of new macrurans from Catalonia, Sant Hipòlit de Voltregà (Barcelona) and from Aragón Region, Serraduy del Pon, Arén, and Belsué (Huesca) increases the carcinologic knowledge from the Eocene of Spain. They are *Enoploclytia eocenica* n. sp. (Erymidae Van Straelen, 1924) and nephropid remains (Nephropidae Dana, 1852 *sensu* Tshudy and Babcock, 1997). The report of *Enoploclytia* McCoy, 1849, extends the geographic and geologic range for the genus to Europe.

Key words: Crustacea, Decapoda, Eocene, Spain.

Resumen - Nuevos registros de decápodos macruros del Eoceno de Cataluña y Aragón (España).

La recuperación de nuevos decápodos macruros en Cataluña (Sant Hipòlit de Voltregà, Provincia de Barcelona), y en la región de Aragón, Serraduy del Pon, Arén y Belsué (Provincia de Huesca), amplía el conocimiento carcinológico del Eoceno de España. Los macruros estudiados se ascriben a la infraorden Astacidea Latreille, 1802, con el registro de *Enoploclytia eocenica* n. sp. (Erymidae Van Straelen, 1924), y a la Familia Nephropidae Dana, 1852 (*sensu* Tshudy and Babcock, 1997). El registro de *Enoploclytia* McCoy, 1849, amplía la distribución estratigráfica de este género en el Eoceno, conocido tan sólo por una especie en los Estados Unidos. El registro de un nefrópido indeterminado, amplía la distribución estratigráfica y paleogeográfica de la familia.

Palabras clave: Crustacea, Decapoda, Eoceno, España.

Riassunto - Nuova segnalazione di decapodi macruri dell'Eocene della Catalonia e Aragona (Spagna).

La recente scoperta di nuovi macruri in Catalonia, Sant Hipòlit de Voltregà (Barcellona) e nella Regione dell'Aragona, Serraduy del Pon, Arén, e Belsué (Huesca) incrementa le conoscenze carcinologiche dell'Eocene della Spagna. Gli esemplari studiati sono stati attribuiti a *Enoploclytia eocenica* n. sp. (Erymidae Van Straelen, 1924) e a resti indeterminati di nefropide. (Nephropidae Dana, 1852 *sensu* Tshudy and Babcock, 1997). La scoperta di *Enoploclytia* McCoy, 1849, estende la distribuzione geografica e geologica di questo genere in Europa.

Parole chiave: Crustacea, Decapoda, Eocene, Spagna.

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Introduction and geological setting

The decapod macrurans assigned here to the genus *Enoploclytia* McCoy, 1849, were circumstantially recovered from Eocene marine deposits during last years and posteriorly housed in the Museu Geològic del Seminari of Barcelona (MGSB). The marine sediments at the type locality are situated about 7 km northwest from the village of Sant Hipòlit de Voltregà (Barcelona Province, Catalonia) (Fig. 1). Deposits are mainly constituted by marls very rich in macrofauna, such as sponges, bryozoans, the echinoids *Coelopleurus* and *Schizaster*, and the brachyuran *Harpactocarcinus punctulatus*. The age is considered to be Bartonian (Middle Eocene), and the local environment is described as a shallow shelf (see Serra-Kiel *et al.*, 2003). Some remains, nearly complete claws and isolated pereopods, were collected from Eocene layers near the villages of Arén and Serraduy del Pon (Huesca Province, Aragón). The strata correspond to the Tremp-Graus basin, being confirmed as Ilerdian (lowermost Eocene) in age (see Serra-Kiel *et al.*, 1994), and are related to not far reefal mounds, which are widely distributed along the basin (see Artal & Castillo, 2005). The associated macrofauna is characterized by the presence of large echinoids (*Linthia*, *Eupatagus*, *Amblipygus* and *Schizaster*), very common in the Ilerdian strata of the area.

A single carapace assigned in this study to Nephropidae Dana, 1852, was recovered about 2 km southeast from the village of Belsué (Huesca Province, Aragón) (Fig.1). The marine deposits from which the decapod macruran was collected correspond to the Margas de Arguís-Pamplona Formation (Puigdefábregas, 1975) and are considered to be Priabonian (Upper Eocene) in age. The local biofacies is characterized by the dominant presence of the brachyuran *Harpactocarcinus punctulatus* and some not well preserved molluscs. The local associated macrofauna, the lithology, marls somewhat sandy, and the location within the basin suggest not extremely deep environmental conditions, probably the photic zone of a shelf facies.

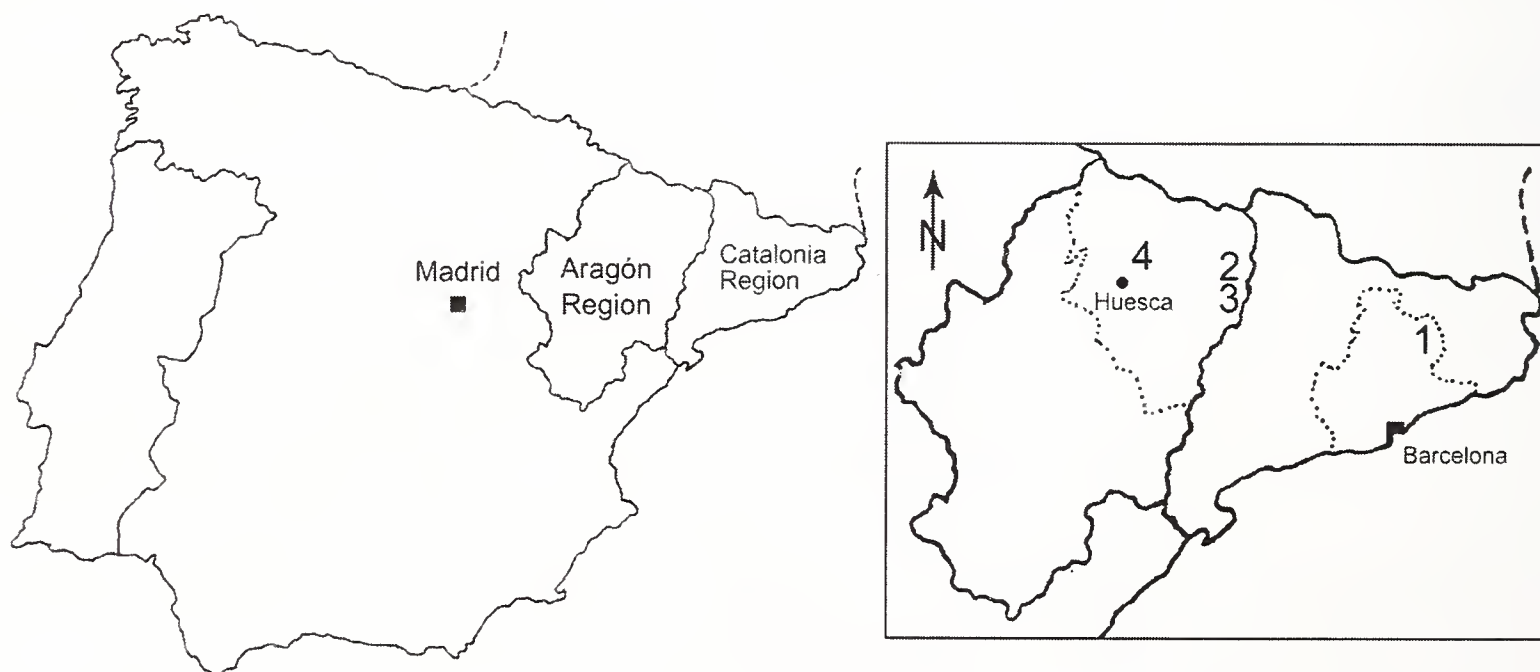


Fig. 1 – Geographic map with the fossiliferous localities / cartina geografica con le località fossilifere. 1) Sant Hipòlit de Voltregà. 2) Serraduy del Pon. 3) Arén. 4) Belsué.

Material

The studied sample includes five fragmentary and articulate specimens, housed in the Museu Geològic del Seminari Conciliar of Barcelona (MGSB). The specimens are preserved three-dimensionally and their preparation was difficult for their fragility and the hardness of the surrounding rock. The studied specimens are ascribed to *Enoploclytia* McCoy, 1849, with *E. eocenica* n. sp. (4 specimens). Moreover, one incomplete specimen is ascribed to Nephropidae with genus and species indeterminate.

Abbreviations

P1, first pereopod

Measurements are given in millimetres (mm).

Systematic Palaeontology

Infraorder Astacidea Latreille, 1802
 Family Erymidae Van Straelen, 1924
 Genus *Enoploclytia* McCoy, 1849

Type species: *Astacus leachii* Mantell, 1822, by monotypy.

Included fossil species: *E. leachii* (Mantell, 1822); *E. dixonii* (Bell, 1850); *E. heterodon* Schlüter, 1862; *E. paucispina* Schlüter, 1868; *E. plauensis* (Geinitz, 1875); *E. granulicauda* Schlüter, 1879; *E. walkeri* (Whitfield, 1883); *E. minor* Woodward, 1900; *E. sculpta* Rathbun, 1926; *E. dorsetensis* Woods, 1927; *E. seitzii* Glaessner, 1932; *E. gardnerae* (Rathbun, 1935); *E. kimzeyi* (Rathbun, 1935); ?*E. selmaensis* (Rathbun, 1935); *E. tumimanus* Rathbun, 1935; *E. glaessneri* Van Straelen, 1936; *E. triglypta* Stenzel, 1945; *E. wintoni* Stenzel, 1945; *E. tenuidigitata* Woods, 1957; *E. collignoni* Secretan, 1964; *E. armata* Secretan, 1964; *E. porteri* Miller & Ash, 1988.

Enoploclytia eocenica n. sp.

Figs. 2-4

Diagnosis: carapace subcylindric; rostrum short, spineless dorsally and ventrally; regions of carapace inflated; cervical, postcervical, and branchiocardiac grooves deep, wide; hepatic groove shallow, narrow; branchiocardiac groove reduced; stocky chela of P1 having three strong teeth on inner lateral margin and two strong teeth on outer lateral margin.

Etymology: the trivial name alludes to Eocene, geological period of the studied specimens.

Holotype: MGSB 58902.

Paratype: MGSB 74526.

Geological age: Middle Eocene (Bartonian).

Type locality: Sant Hipòlit de Voltregà (Barcelona, Catalonia).

Material and measurements: one complete carapace and three articulate chelae.

MGSB 58902 – length of carapace: 88

MGSB 74526 – length of the chela: 74

MGSB 58902, 74520, 74526 (part and counter-part), 74527

Even though the type locality is Sant Hipòlit de Voltregà, the studied specimens come from different localities, as follows:

Sant Hipòlit de Voltregà (Barcelona, Catalonia): MGSB 58902, 74520

Serraduy del Pon (Huesca, Aragón): MGSB 74526

Arén (Huesca, Aragón): MGSB 74527

Abdomen, cephalic and abdominal appendages not preserved.

Description. Large-sized erymid with exoskeleton and P1 strongly tuberculate.

Carapace. Carapace subcylindric with strongly ashlar dorsal margin. Posterior margin slightly sigmoid, produced near posteroventral termination. Posteroventral margin strongly curved. Anteroventral margin inflated and inclined from anterior termination ventrally to near posterior termination of cephalic region where it curves slightly ventrally to join posteroventral margin. Anterior margin almost vertical. Rostrum short, spineless ventrally and dorsally. Cervical groove straight, slightly inclined, intercepting dorsal surface at an angle of about 70° at a distance one third of total length of dorsal margin from anterior. Branchiocardiac groove slightly inclined, reduced, approaching dorsal surface at an angle of about 60° . Postcervical groove slightly inclined, parallel to branchiocardiac groove for its all length. Hepatic groove prominent, slightly curved postero-ventrally. Cervical, postcervical, and branchiocardiac grooves deep, wide. Hepatic groove shallow, narrow. Branchial region strongly expanded. All regions ornamented by large tubercles.

Thoracic appendages. P1 with stocky chela preserved as inner face. Enlarged propodus with three strong teeth on inner lateral margin and two strong teeth on outer lateral margin. Movable and finger fingers slightly curved distally. Carpus subrectangular and short. Surface of chela and carpus strongly tuberculate.

Discussion. As reported by Secretan (1964), *Enoploclytia* is characterized by possession of carapace with well developed rostrum and branchial region strongly expanded, deep and wide cervical groove, postcervical groove most important than the cervical groove but narrowed downwards, branchiocardiac groove reduced, pereopod 1 with stocky chelae, strongly tuberculate carapace and P1.

The most part of these morphological characters are visible on the studied specimens that are ascribed to this genus.

At present, *Enoploclytia* has known from the Triassic to the Paleocene in Central and Northern Europe (Schlüter, 1862, 1879; Fritsch & Kafka, 1887; Glaessner, 1933; Van Straelen, 1936; Mertin, 1941; Förster, 1966), Great Britain (Mantell,

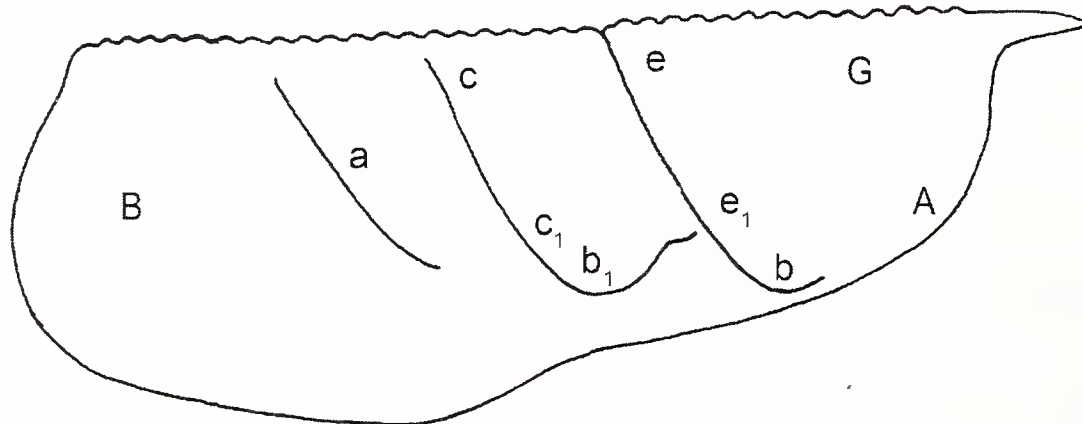


Fig. 2 – *Enoploclytia eocenica* n. sp., carapace. A) antennal region / regione antennale. B) branchial region / regione branchiale. G) gastric region / regione gastrica. a) branchiocardiac groove / solco branchiocardiac. b) antennal groove / solco antennale. b₁) hepatic groove / solco epatico. c-c₁) postcervical groove / solco postcervicale. e-e₁) cervical groove / solco cervicale.



Fig. 3 – *Enoploclytia eocenica* n. sp., holotype / olotipo, MGSB 58902 (x 0.7).

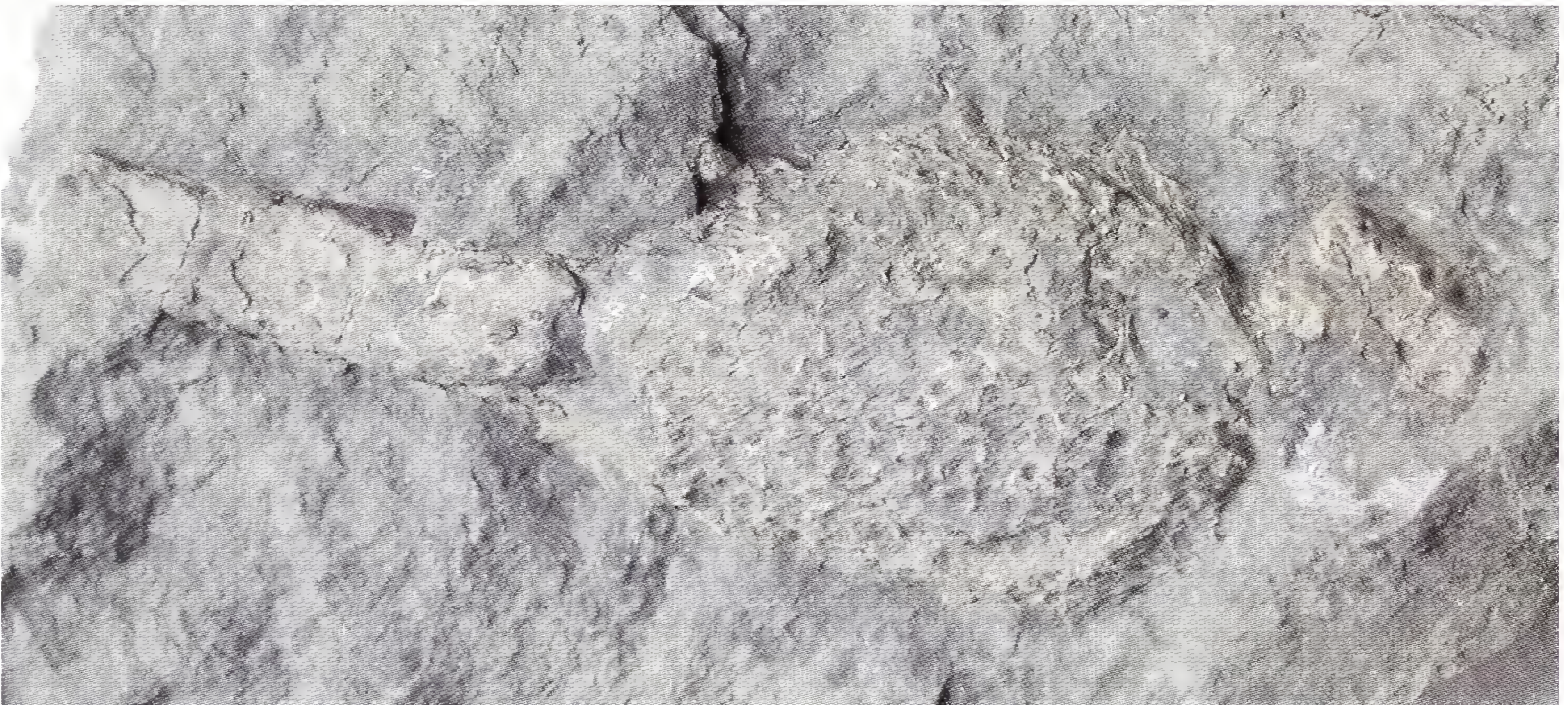


Fig. 4 – *Enoploclytia eocenica* n. sp., MGSB 74526, chela of P1, inner face / chela del P1, faccia interna (x 1.3).

1822; McCoy, 1849; Woods, 1930), Niger (Joleaud & Hsu, 1935), Madagascar (Secretan, 1964), N America (Rathbun, 1935; Stenzel, 1945; Beirich & Feldmann, 1980; Miller & Ash, 1988), S America (Aguirre-Urreta, 1989; Vega, 2005, Vega *et al.*, 2007), and Australia (Woods, 1957; Hill *et al.*, 1968). Much discussed is the belonging of *E. porteri* from the Triassic of Arizona (Miller & Ash, 1988) to this genus. In fact, Aguirre Urreta (1989) pointed out that the diminutive and smooth specimen can hardly be placed in *Enoploclytia* or even in the Erymidae. It could be probably a true fresh-water crayfish, related to the Northern Hemisphere Astacidae or Cabaridae and allied forms. Moreover, it is much discussed the record of *Enoploclytia* in the Eocene. In fact, ?*E. selmaensis* (Rathbun, 1935) is reported in dubitative form from the Eocene of North America (Feldmann, 1981). The poor preservation of this species did not allow a comparison with the new species.

So *Enoploclytia eocenica* n. sp. represents the only testified and most complete species from the Eocene, enlarging the stratigraphic range of the genus.

Family Nephropidae Dana, 1852 *sensu* Tshudy and Babcock, 1997

Genus and species indeterminate

Fig. 5

Locality: Belsué (Huesca, Aragón).

Geological age: Upper Eocene (Priabonian).

Material: one fragmentary specimen. MGSB 74523

Discussion. Even though the studied specimen is fragmentary it is ascribed to Nephropidae for the presence of two strongly raised lateral ridges in the posterior portion of carapace and one median ridge interrupted proximally by a deep cervical groove. In fact the presence of impressive ridges in the posterior portion of carapace is a typical character of some living and fossil genera of Nephropidae, like *Nephropsis* Wood-Mason, 1873, *Metanephrops* Jenkins, 1972, *Nephrops* Leach, 1814, *Lissocardia* v. Meyer, 1851, and *Palaeonephrops* Mertin, 1941.



Fig. 5 – Nephropidae, genus and species indeterminate / nefropide, genere e specie indeterminate, MGSB 74523, posterior part of carapace / parte posteriore del carapace (x 5.7).

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